Washington State Ferries

Green Building Technical Memorandum

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Project:	Green Building Compliance

Pt. Defiance Ferry Terminals Project
Commentary - Site Design and Sustainability Goals

Introduction

Each of the Pt. Defiance/Tahlequah ferry terminal schemes has been reviewed and considered with respect to sustainable principles and concepts, and the ability to apply LEED™ requirements and ratings. The proposed site schemes represent different opportunities for implementation of sustainable design strategies. This review is not comparative, but rather is submitted to emphasize the range of possible strategies at each site. In this review, no specific scheme is preferred above the others. The sustainable considerations listed below illustrate an additional layer of consideration for decision-makers/stakeholders to incorporate in the selection of the ferry terminal sites. These sustainable criteria (principles, concepts, and goals) in conjunction with considerations of budget, schedule, efficient operations, etc., should be applied to each scheme to determine which will best meet overall project goals and objectives. The site that provides for the greatest number of overall sustainable measures to be integrated and incorporated into the design will result in greatest environmental, social and economic benefits to the project.

The prominent sustainable considerations are the environmental impacts of construction and operations upon sensitive underwater species and habitat, the adjacent communities and water quality. The primary measures to thoroughly research, discuss and take full advantage of are those related to stormwater management. It is strongly recommended that the site scheme selected for development and construction provide maximum ability to integrate innovative stormwater management measures with site features.

Commentary

Sustainable review comments on the proposed conceptual terminal/site designs are as follows:

Baseline standards include EIS mitigation requirements, materials selection described in EPA materials requirements, and local or agency Environmental Policy. The strategies listed below have largely been accepted by the construction industry due to their good cost-benefit ratio or short-term payback or are rapidly becoming standard as the construction industry adapts to sustainable design. Baseline terminal facilities design items selected for the drawings and materials list should include, but not be limited to:

- Low flow, efficient plumbing fixtures
- Energy efficient lighting features (daylight sensors for site lighting)

- Low-emitting materials (paints, adhesives, carpet, formaldehyde-free wood products0
- Recycling area/containers
- Facilities or amenities for multi-modal connections
- Pervious surface/paving at pedestrian walks
- Native/drought tolerant landscape planting
- Innovative on-site stormwater management and filtration (i.e., grading landscape for bioswales)
- Access by bicycles and bicycle storage
- Reduced light pollution impacts (zero direct-beam illumination)
- Reduced energy consumption (occupancy sensors, efficient lighting fixtures, instantaneous hot water equipment, etc.)
- Natural ventilation and daylighting at facilities structures
- Green materials selection (recycled content and salvaged)
- Materials ensure rapid removal of graffiti
- Provide (HVAC) equipment with non-HCFC (HydroChloroFluoroCarbon) refrigerants
- Use of Biodiesel for construction equipment
- Determine how terminal meets desired LEED™ requirements and rating.
- Use of recyclable materials during construction (i.e., glass cullet for aggregate base course, fly ash in concrete)
- Utilize existing recycling centers to the maximum extent possible
- Incorporate salvaged materials for site landscape and art elements
- IAQ plan verified by certified commissioning consultant during design and construction phases
- Integrated Pest Management techniques for landscape management during construction phase and operations.
- Vegetable-based lubricants and other maintenance substances during construction and design.

Substantial design elements are the selected set of sustainable materials and principles that exceed the baseline and could be incorporated to enhance the architectural expression and experience of the terminal. These strategies are more innovative in nature and carry with them cost considerations. These would serve as features of a demonstration project to promote sustainable awareness and showcase growing application of sustainable practices in the region. These strategies below also provide long-term cost savings and educational opportunities:

- Innovative water efficient techniques: Integrate stormwater feature(s) and storage techniques to provide non-potable/greywater use (toilet flushing system, landscape irrigation, maintenance/cleaning needs)
- Innovative design and technologies
- Consider green roofs for all facilities structures
- Integrate rainwater collection with roof form design and vertical site/structural elements
- Integrate on-site alternative energy systems (solar, wind) with advantageous orientation and proposed roof system

- Integrate pervious paving at parking and passenger loading areas especially adjacent to vegetation
- Improve on-site habitat and increase project site connections to nearby habitat areas
- Provide native and drought tolerant vegetative cover (including tree canopy) over 30% of developed site area

Conclusion

Implementation of sustainable measures can decrease the negative impacts of construction activities at and around potential ferry terminal sites and can provide long-term strategies to meet a desired operations goals and environmental, social and economic objectives. Any of the above strategies can be applied to the schemes proposed and are to be considered along with the accompanying documents:

- Basic Principles
- Sustainable Work Plan
- Sustainability Strategies Table

A sustainable approach to site and facilities design promotes the adoption of standards and practices (i.e., Best Management Practices, and local, state or federal laws and regulations) that encourage environmentally-based decisions. Environmental consideration in relation to the design of the terminals identifies impacts to the quality of both the built urban environment and the open and green spaces that compose the urban natural environment. In general, the sustainable strategies proposed intend to avoid or minimize potential impacts through an integrated design approach.

A more detailed analysis to determine cost and environmental benefits is required. This analysis could be applied to better compare the proposed schemes, or to analyze the long-term benefits of the preferred scheme.

Basic Principles of Sustainability:

Pt. Defiance Ferry Terminals

Design:

- Minimize impact to sensitive wildlife habitat areas
- Encourage connections to other forms of public transportation
- Encourage pedestrian circulation
- Provide good access and secure storage for bicycles
- Use drought-tolerant native planting
- Maximize on-site stormwater management and infiltration systems
- Use pervious materials for paving at parking, passenger loading, and other hard landscape areas
- Provide universal access to site and terminal
- Control landscape lighting so as to minimize light pollution
- Direct stormwater runoff away from Puget Sound

Materials and Resources:

- Use materials that have low embodied energy, are from local sources, include recycled or post-industrial waste content, are non-toxic, durable and easily maintained
- Use salvaged or recycled content from buildings demolished on site whenever possible

Energy:

- Use energy efficient equipment, lighting fixtures, and mechanical devices
- Maximize natural ventilation; use HVAC systems only where required for rooms requiring constant temperature
- Daylight spaces to the greatest extent possible, and use daylight and occupancy sensors on light fixtures
- Consider alternative energy sources for some station power requirements

Water:

- Use low consumption plumbing fixtures
- Avoid the use of potable water for landscape irrigation
- Improve on-site runoff water quality
- Catch, store and use stormwater for non-potable uses (i.e., toilet flush, maintenance, and irrigation)
- Composting toilets during construction phase

Indoor Environmental Quality

- Use low-emitting adhesives, paints, carpets and formaldehyde-free composite wood products
- Control tobacco smoke throughout the building
- HVAC protection and filtration during construction

Sustainability Work Plan

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Design:

1. Scheme selection at both terminal sites should emphasize the most opportunities for integration of sustainable strategies. An integrated design approach will enhance the efficiency and best determine the practicality of potential sustainable strategies for the project as a whole.
2. Initiate discussion with utilities to create a unified approach to energy strategies and explore existing incentive programs.
3. Determine applicability of LEED™ rating system and assist in establishing policy regarding certification. Understand impact of LEED™ certification on budget.
4. Research patterns of power consumption and resource utilization for typical ferry terminals so as to create a baseline for testing green initiatives.
5. Receive and co-ordinate input from the public, consultants, organizations and business enterprises regarding green building ideas.
6. Understand community context of sustainability goals and explore ways to integrate community involvement, including public art, educational initiatives, community construction projects, etc.

Green Building:

1. Research green building strategies that might be applied to the Ferry Terminal Project:
    - Research sustainability initiatives undertaken by other transit authorities for design, construction, operation and maintenance.
    - Understand the Northwest context of sustainability - limitations and opportunities based on local climate, material supply, etc.
    - Research green building strategies successfully included in local non-transit infrastructure projects.
    - Understand implications of operations and maintenance on green building decisions.
    - Understand the special environmental demands for special structures.

- Research availability of special materials such as salvaged components.

2. Perform energy and other modeling of alternative design strategies.
3. Narrow scope of possible green alternatives and provide ranking of cost effectiveness for each strategy. Create recommended list of strategies based on life cycle costing analysis. Identify any premium associated with additional services, scheduling impacts, material substitutions, etc.
4. Finalize scope of green building strategies to be included contract should identify which items will form part of the prescriptive specifications, which will be required on a performance basis, and which will be included as alternates for pricing by the contractors.

Part 3: Contract Documentation:

1. Develop standard specifications for systemwide elements, fully integrating green products, standards, and performance criteria where applicable.
2. Develop method to track sustainability issues and co-ordinate strategies among consultants and contractor.
3. Develop method to monitor costing of green strategies and evaluate proposed alternative strategies.

The following are various sustainability measures to be considered for the Ferry Terminal Project.
Must – Inclusion of strategy may be dictated by regulatory authority or industry standards; provides maximum benefits (environmental, economic, and social) over long term.
Should – Inclusion of strategy enhances long term benefits and exceeds regulations or industry standards.
Nice – Inclusion of strategy provides additional benefits to overall project goals.

Ferry Terminal Sustainability Strategy	Must/Should/ Nice to Have	Benefit	Status
On-site power generation for site and building lighting through alternative means (solar, wind).	Nice	Depending on method: possible environmental and cost benefit	Requires research and discussion of incentive opportunities.
Reuse greywater/stormwater for on-site non-potable water needs (toilet flush, irrigation, maintenance)	Nice	Environmental and possible cost benefit.	Requires further discussion / research.
Integrate pervious surface materials into design of parking and passenger loading areas	Nice	Environmental	Requires further discussion / research.
Direct stormwater runoff to bioswales and/or other on-site catchment systems.	Should	Environmental and possible cost benefit.	Requires further discussion / research.
Site selection maximizes opportunities for integration of sustainable strategies	Must	Environmental	Requires further discussion / research.
Safe disposal of hazardous materials (paints, grease, oils, etc.) during construction and used for maintenance	Must	Environmental and social/health benefit	No cost implications.
Facilities and building material selection emphasizes low maintenance and durability	Must	Environmental and possible cost benefit	Requires further discussion / research.
Use of recycled materials	Must	Environmental and possible cost benefit	Need to research cost implications.
Storm Water Management; erosion and sedimentation control plans for construction to be approved by governing agencies	Must	Environmental	Typically required for permit. Can be specified with no cost implications. Identify agency specifications addressing temporary works and confirm inclusion in RFP.
Minimize impact of construction equipment and operations to conform or exceed local requirements with respect to air quality and noise abatement, etc.	Should	Environmental and social /health benefit	Typically required for permit. Can be specified with no cost implications. Identify agency specifications addressing temporary works and confirm inclusion in RFP.

Ferry Terminal Sustainability Strategy	Must/Should/ Nice to Have	Benefit	Status
Minimize impact of construction equipment and operations to conform or exceed local requirements with respect to water quality and protected species and habitat, etc.	Must	Environmental and social /health benefit	Typically required for permit. Can be specified with no cost implications. Identify agency specifications addressing temporary works and confirm inclusion in RFP.
Minimize impact to traffic (develop coordinated plan approved by appropriate agency authority)	Must	Environmental and social /health benefit	Typically required for permit. Can be specified with no cost implications. Identify agency specifications addressing temporary works and confirm inclusion in RFP.
Use of recyclable materials during construction - Use of **Fly ash** in concrete (suitable in mass foundation works)	Must	Environmental and potential cost benefit	Relatively low cost implications. Further research required.
Use of recyclable materials during construction - Use of **Biodiesel** for construction equipment (haul trucks, excavators, front-end loaders, etc.)	Should	Environmental	Further research required to identify large equipment suppliers that may be using this product and local availability.
Minimize excess construction materials or "attic stock" during Construction purchased but unused at the site	Should	Environmental	Relatively low cost implications, research required.
Reduce construction debris disposed at landfills; e.g. recycle paper, wood used for formwork, etc	Should	Environmental	No or relatively low cost implications, research required.
Utilize existing recycling centers to maximum extent possible	Must	Environmental	No cost implications. Identify agency specifications and confirm.
Reuse or recycle demolition materials (e.g. from existing structures and/or buildings	Should	Environmental	Relatively low cost implications, research required.
Utilize soil from on-site excavation operations for useful purposes in site design or off-site.	Nice	Environmental	Relatively low cost implications. Research and discussion required.
Integrated Design Team Review to determine potential design opportunities to site and facilities design	Should	Environmental and possible cost benefit	Confirm ideas; interface with consultant design teams to confirm ideas.
Promote construction materials that meet Sustainable Design goals. Reference Sustainable Design approved materials lists as published by the EPA	Must	Environmental	Relatively low cost implications, research EPA list. Confirm project requirement is in RFP.
Contract bidder Statement of	Must	Environmental	Can be specified with no cost

Ferry Terminal Sustainability Strategy	Must/Should/ Nice to Have	Benefit	Status
Corporate Policy			implications. Confirm project requirement is in RFP
Contract bidder required to illustrate implemented Sustainable Design programs	Must	Environmental	Can be specified with no cost implications. Confirm project requirement is in RFP
Develop Sustainable Design program for project	Must	Environmental	Can be specified with no cost implications.
Method of measurement to prove Sustainable Design objectives have been met	Should	Environmental	Research other similar/potential projects
Development of points system responding to various Sustainable Design aspects to the bid	Should	Environmental	Research other similar/potential projects